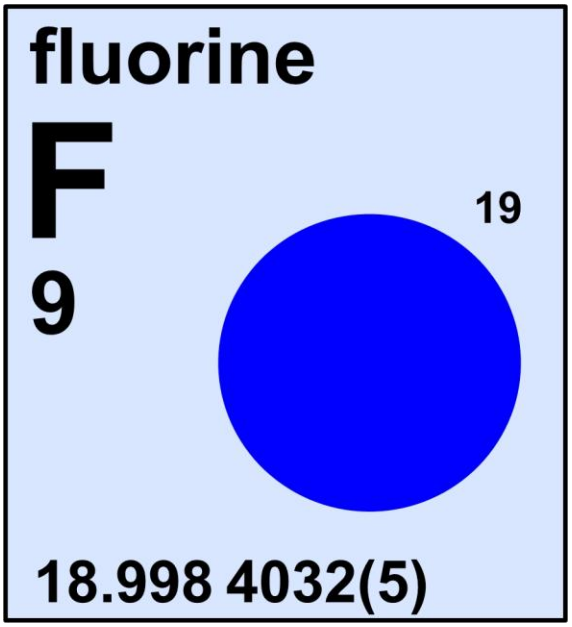
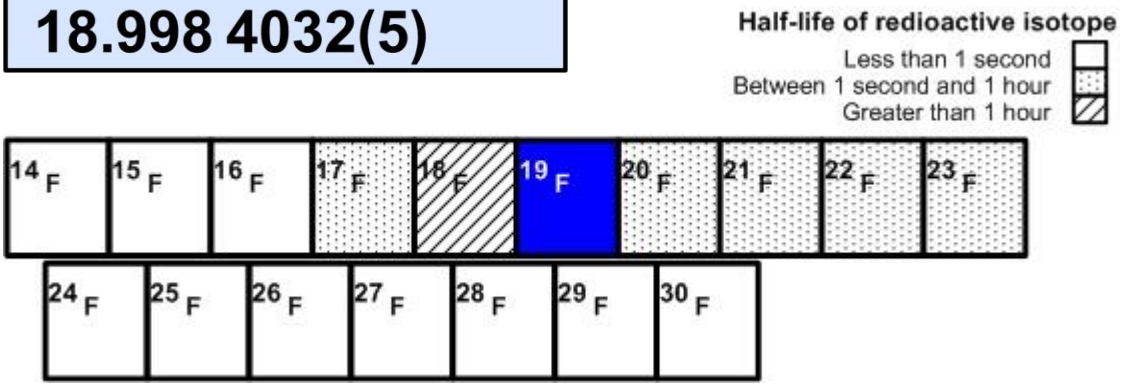
fluorine



Stable isotope	Atomic mass*	Mole fraction
^{19}F	18.998 403 22	1.0000

* Atomic mass given in unified atomic mass units, u.



Important applications of stable and/or radioactive isotopes

Isotopes in medicine

1) ^{18}F is a radioactive fluorine isotope that is used in an ^{18}FDG compound (^{18}F- labeled, fluorodeoxyglucose) for imaging the organs, bones, tissues and brain of the body with a technique called a Positron Emission Topography (PET) scan.
    a. ^{18}F emits positrons (positive electrons) that, when injected into the body, collect in tissue and interact with regular negative electrons. The positrons and electrons annihilate each other, producing two gamma particles that are emitted in opposite directions, releasing X-ray-like radiation. The radiation is detected on a PET camera which generates a picture of the body part being examined.
    b. Because ^{18}F has a short half life of about 110 minutes, there is little chance of radiation damage to the patient.

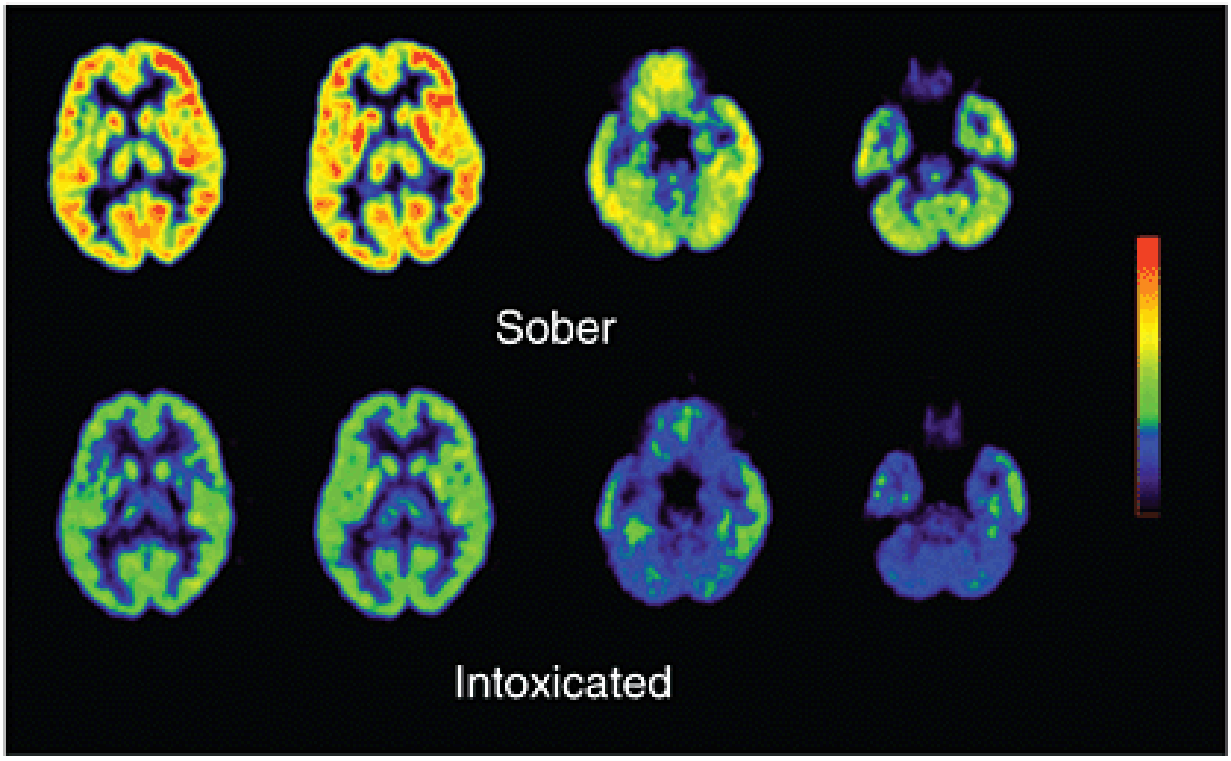


Figure 1: An ^{18}FDG PET scan is used to observe the differences in brain activity between a sober and an intoxicated brain.